

GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF FEBRUARY 23, 1991

1. Western North America:

EXCEPTIONALLY DRY WEATHER CONTINUES.

Little or no precipitation, with widely scattered totals up to 15 mm, was again reported across California. In addition, very low totals (below 5 mm) were measured throughout southern and western Idaho while 25-70 mm dampened a small portions of the east-central Panhandle. Amounts below 20 mm were also reported in afflicted sections of Canada. Since early January, only about 1% of normal precipitation has fallen across southern California, and deficits of 60-180 mm have accumulated throughout the affected areas. Shortfalls up to 400 mm were observed at some higher elevations [8 weeks].

2. Southeastern United States:

INUNDATING RAINFALL BRINGS SEVERE FLOODING.

Less than 20 mm of rain fell across the Florida Panhandle, engendering further recovery, but excessive rainfall was measured across much of the region, aggravating already large surpluses and generating severe flooding. Exceptionally heavy rainfall (200-350 mm) drenched the region from south-central Arkansas northeastward through south-central Tennessee, and abnormally large totals elsewhere (50-200 mm) kept moisture surpluses large. Despite recent dryness, six-week excess rainfall totals 100-310 mm along the Florida Peninsula and 50-200 mm in most other areas [13 weeks].

3. Eastern South America:

SCATTERED RAINS SHRINK DRY AREA.

Scattered moderate rainfall limited large precipitation deficits to small portions of eastern Uruguay and extreme southern Paraguay, bringing an end to widespread moisture deficits [Ended after 10 weeks].

4. Central Europe:

COLD SNAP EASES, BUT PRECIPITATION REMAINS DEFICIENT.

Temperatures averaged slightly below normal (weekly departures of -2°C to -4°C) across central and southeastern Europe and in northern Scandinavia, but at or above normal in the rest of Europe, bringing an end to the recent cold snap [Ended after 5 weeks]. Meanwhile, moderate to heavy precipitation reduced short-term deficits along the southern and northeastern tiers of the region. Totals of 20-50 mm were recorded across the central and southern Iberian Peninsula, Corsica, Sardinia, parts of central

and southern Italy, southern Yugoslavia, southern Greece, western Turkey, central Great Britain, southern and eastern Ireland, and eastern Scandinavia while 50-90 mm fell on extreme southern Spain and across south-central Scotland and north-central England. In contrast, little or no precipitation (under 20 mm) fell elsewhere, and most locations have measured 40-200 mm below normal rainfall since early January, with the largest deficits measured in typically wetter portions of the Alps and southern Europe [10 weeks].

5. Southern Africa:

A RELATIVELY DRY WEEK BRINGS LIMITED RELIEF.

Moderate rains (20-85 mm) fell across eastern sections, including eastern Zambia, Malawi, Zimbabwe, and much of eastern South Africa, except near Swaziland. Elsewhere, little or no precipitation allowed moisture surpluses to decrease [Ending after 8 weeks].

6. The Philippines and Southeastern China:

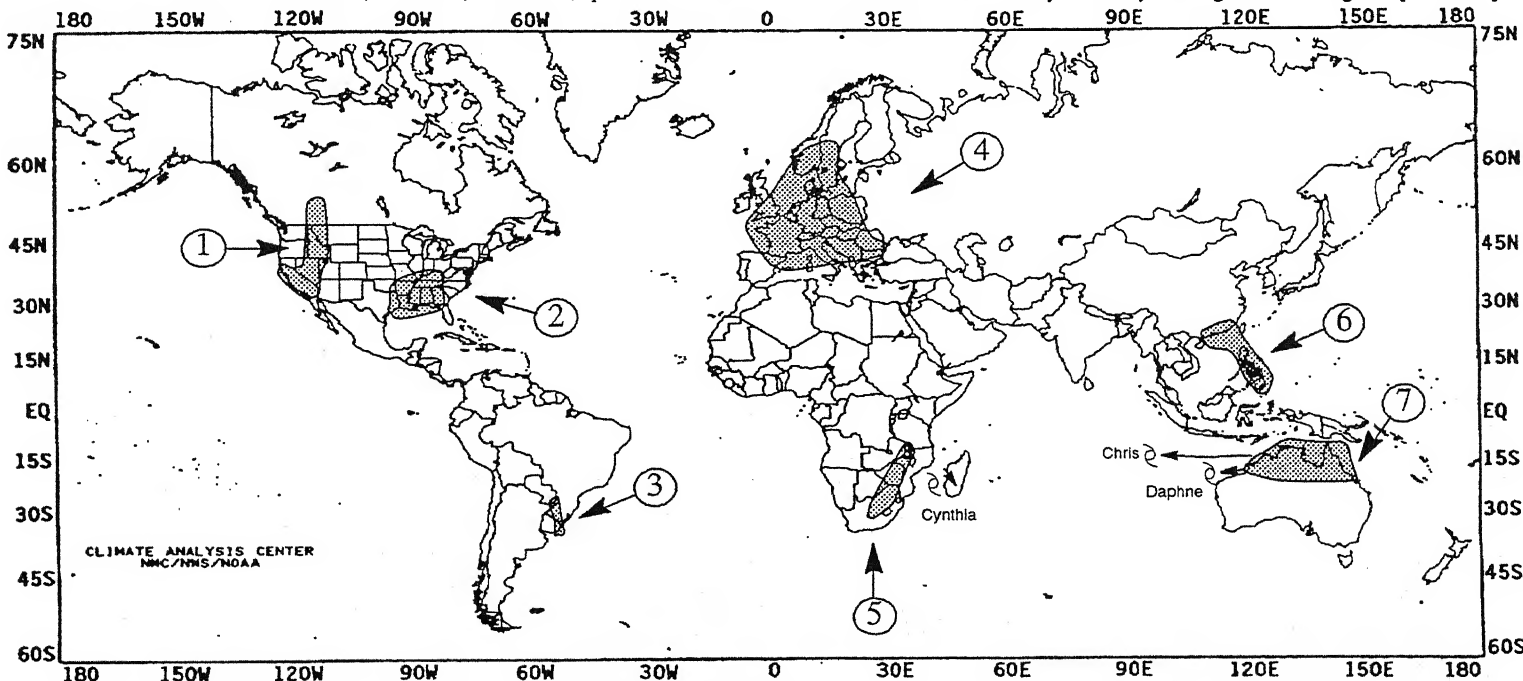
SPOTTY MODERATE RAINS SLIGHTLY EASE PHILIPPINE DROUGHT AS DRYNESS EXPANDS NORTHWARD

Six consecutive weeks of light rainfall (weekly totals under 15 mm) have generated significant precipitation deficits along the southeastern Chinese coast. Deficits of 40-75 mm have accumulated in most locations, with some typically wetter locales measuring up to 120 mm below normal totals. Farther south, significant rains across much of the central and eastern Philippines brought limited relief to the parched islands. Amounts of 40-95 mm were measured across southern Luzon and northern Mindoro while 40-135 mm dampened Samar, Cebu, and northeastern Mindanao [12 weeks south; 6 weeks north].

8. Northern Australia:

UP TO 2100 MM OF RAIN IN 2 MONTHS.

Heavy rains again soaked the northern third of Australia. Totals of 35-100 mm were measured west of Arnhem Land while totals of 100-200 mm were widespread farther east. In addition, exceedingly heavy rains (230-370 mm) deluged isolated coastal locations in northern Arnhem Land and east-central Queensland as well as the entire western and northern three-quarters of the Cape York Peninsula. Since Christmas Day, up to 2100 mm of rain has pounded the east-central Queensland coast, where 1435-1485 mm above normal precipitation has fallen during the period. More recently, surpluses of 100-550 mm have accumulated since early January throughout the region [9 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.
MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF FEBRUARY 17 - 23, 1991

The northern hemisphere's current winter-to-spring transition was obvious across the nation last week. Springlike conditions dominated much of the South as heavy showers and scattered severe thunderstorms dumped up to 13 inches of rain on some locations in northern Mississippi. One storm buried parts of Shreveport, LA under four inches of golfball-sized hail while another storm spawned a tornado in Elysian Fields, TX. Flooding was rampant from the Gulf Coast to the Ohio River Valley. In contrast, wintry weather covered much of the northern tier of states as a strong storm system dumped up to 18 inches of snow across portions of the northern Plains. Strong winds and frigid Arctic air combined to drive wind chills below -20°F from North Dakota to Maine. Farther west, up to a foot of snow blanketed parts of the Rockies from New Mexico to Wyoming. Record warmth covered much of southern Florida on Saturday as highs pushed to near 90°F , a dramatic increase from the cold snap that enveloped the region on Sunday morning, when lows dipped into the thirties. Unseasonably warm conditions also covered much of the Far West as numerous record highs were established in California and Oregon. Dry weather continued across California, which has been suffering through a fifth consecutive winter drought. Strict water conservation measures have been implemented throughout the state, and eleven of the 58 counties in the state have been declared drought disaster areas. Farther north, heavy snow and much more seasonable temperatures were observed across much of Alaska. Meanwhile, heavy thunderstorms dumped up to 7 inches of rain across parts of the Hawaiian Islands.

The week began with unseasonably cold conditions gripping much of the eastern quarter of the nation. Record low temperatures were reported across southern Florida Sunday morning with readings in the thirties as far south as Tampa. Farther west, a developing area of low pressure over the Rockies produced up to a foot of snow across portions of Utah and Wyoming. The storm system tracked into the northern Great Lakes by late Tuesday, spreading heavy snow from South Dakota to northern Michigan. Up to 10 inches of snow covered the Black Hills while another 18 inches blanketed east-central South Dakota. A cold front stretching from northern Michigan to the central Gulf Coast pushed slowly southeastward, spawning thunderstorms across much of the lower Mississippi Valley and Gulf Coast states. One storm dumped up to 3.5 inches of rain on Longview, TX in a 6 hour period. Scattered urban and river flooding was reported at a number of locations after several inches of rain fell in short time spans. Farther west, a cold front moved onshore into the Pacific Northwest, generating over 3 inches of rain and 60 mph wind gusts along the coast and heavy snow across the Cascades. To the south, unseasonably warm and dry conditions continued across much of southern California and the Southwest as readings soared into the eighties.

During the last half of the week, temperatures rose sharply across the East to levels more representative of April. Record highs were established or tied at over a dozen eastern cities Wednesday through Saturday. Unseasonably warm conditions were also reported in much of the western half of the country as high temperatures soared to 25°F above normal in of the Plains. In sharp contrast, bitterly cold air, strong winds, and heavy snow blanketed extreme northern sections of Minnesota and Wisconsin. Farther south, an area of low pressure tracked eastward across the Gulf States, dumping additional rainfall that further aggravated flooding across the Deep South. In contrast, relatively dry conditions persisted across the West as high pressure settled over the Great Basin.

According to the River Forecast Centers, the greatest weekly totals (8.5 to 13.2 inches) were measured from south-central Arkansas northeastward through south-central Tennessee (see front cover). More than four inches fell from extreme southern sections of the Ohio Valley southward through the central and west-central Gulf Coast as well as across western Washington and southeastern Alaska (see Table 1). Scattered heavy amounts were found in southern Maine and on Hawaii island. Moderate amounts fell on parts of the Southeast, the central Appalachians, and southern Alaska including the Aleutians. Light totals were measured across the remainder of the eastern half of the nation, except in Florida. Little or no precipitation fell on Florida, the central Plains, the northern Rockies, the Intermountain West, and the Far West.

Unseasonably warm weather covered the entire contiguous U.S. including areas that were invaded by wintry weather early in the week. Weekly departures of $+10^{\circ}\text{F}$ to $+12^{\circ}\text{F}$ were measured across parts of the Southeast, Midwest, central and northern Plains and northern Rockies (see Table 2). Despite an early blast of frigid air, portions of the central Plains, upper Midwest, and Florida still managed to average 4°F to 8°F above normal. The remainder of the country experienced unseasonably mild conditions with weekly departures anywhere from $+2^{\circ}\text{F}$ to $+6^{\circ}\text{F}$ common from northern New England to southern California. Farther north, mild conditions prevailed across the southeastern sections of Alaska, where highs pushed into the forties and produced departures of $+2^{\circ}\text{F}$ and $+4^{\circ}\text{F}$. Only the Big Bend area of Texas and adjacent southeastern New Mexico were near normal.

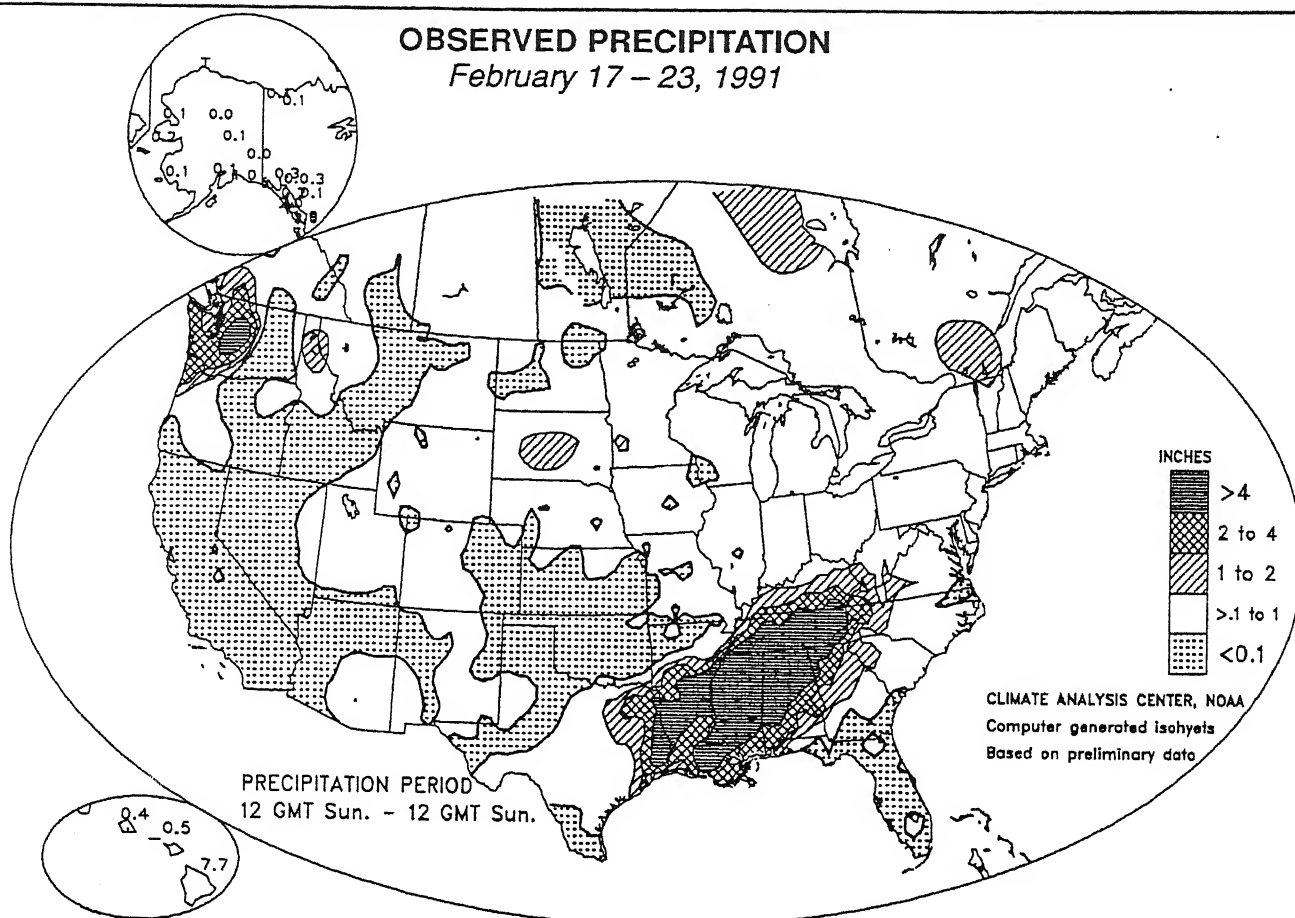
Seasonably cold weather returned to most of Alaska, including the Aleutians. Weekly departures between -9°F and -19°F were observed across southwestern portions of the state, and lows plunged below -30°F in northern and central sections (see Table 3). The remainder of the state reported weekly departures between -2°F to -8°F , with mild air enveloping the panhandle.

TABLE 1. Selected stations with 4.00 or more inches of precipitation for the week.

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
TUPELO, MS	9.62	KNOXVILLE, TN	5.66
MUSCLE SHOALS, AL	9.26	ANNISTON, AL	5.40
GREENWOOD, MS	9.10	TUSCALOOSA, AL	5.24
COLUMBUS AFB, MS	8.60	YAKUTAT, AK	5.11
MERIDIAN NAS, MS	8.07	BATON ROUGE, LA	5.06
HILO/LYMAN, HAWAII, HI	7.70	CROSSVILLE, TN	5.01
HUNTSVILLE, AL	7.59	MCCOMB, MS	4.85
MERIDIAN, MS	6.78	JACKSON, TN	4.23
CHATTANOOGA, TN	6.45	BOSSIER CITY/BARKSDALE AFB, LA	4.22
CENTERVILLE, GA	5.99	SHREVEPORT, LA	4.19

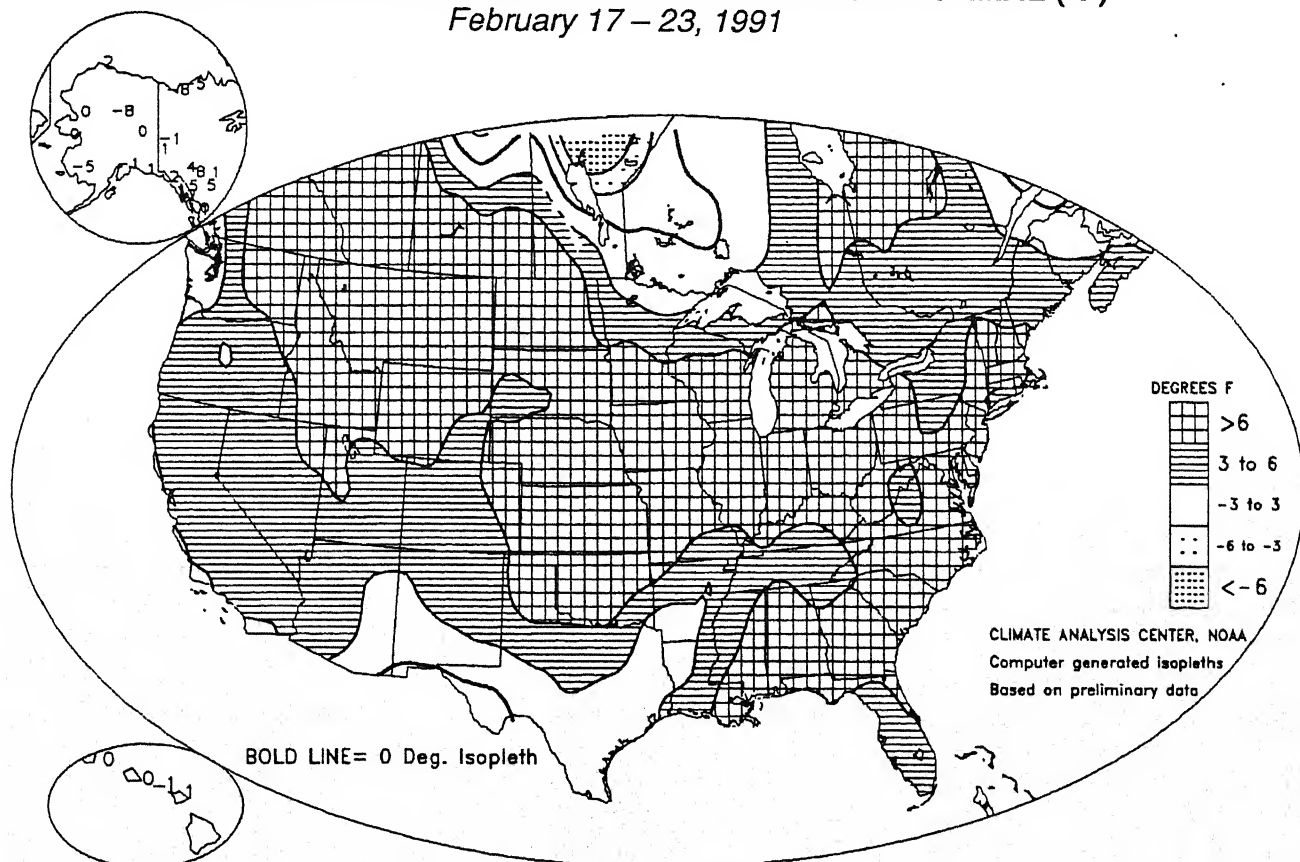
OBSERVED PRECIPITATION

February 17 - 23, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

February 17 - 23, 1991



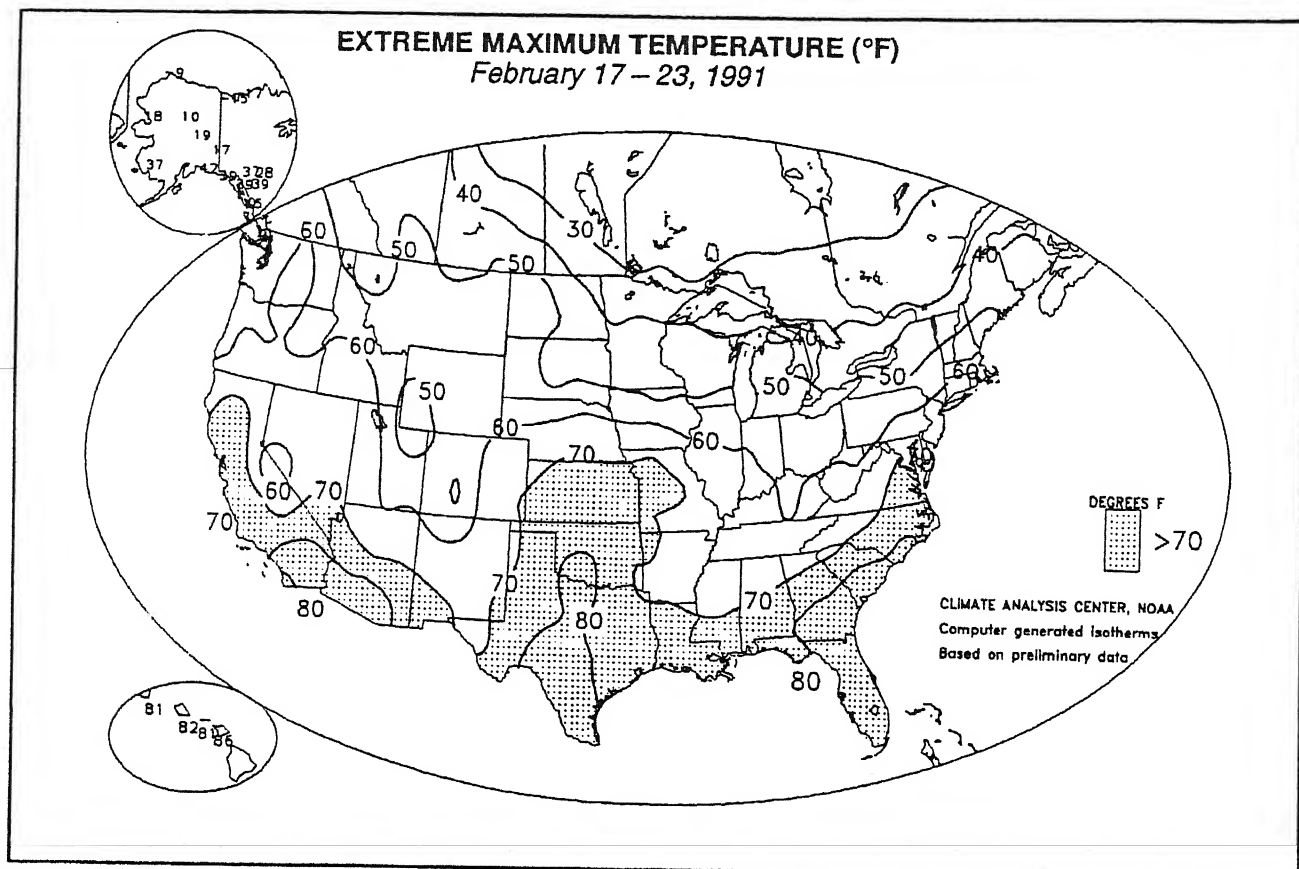


Figure 1. Extreme maximum temperature (°F) during the week of February 17-23, 1991. For the third straight week, unseasonably mild air covered much of the country (with the exception of a brief cold snap around mid-February in the central and eastern U.S.), pushing daily maximum temperatures well above normal. Highs more typical of early to mid-spring prevailed across the Southwest, southern and central Plains, Southeast, and mid-Atlantic as the thermometer frequently surpassed 70°F, occasionally rose above 80°F, and even hit 90°F [at Ft. Lauderdale, FL and McAllen, TX].

TABLE 2. Selected stations with temperatures averaging 10.0°F or more ABOVE normal for the week.

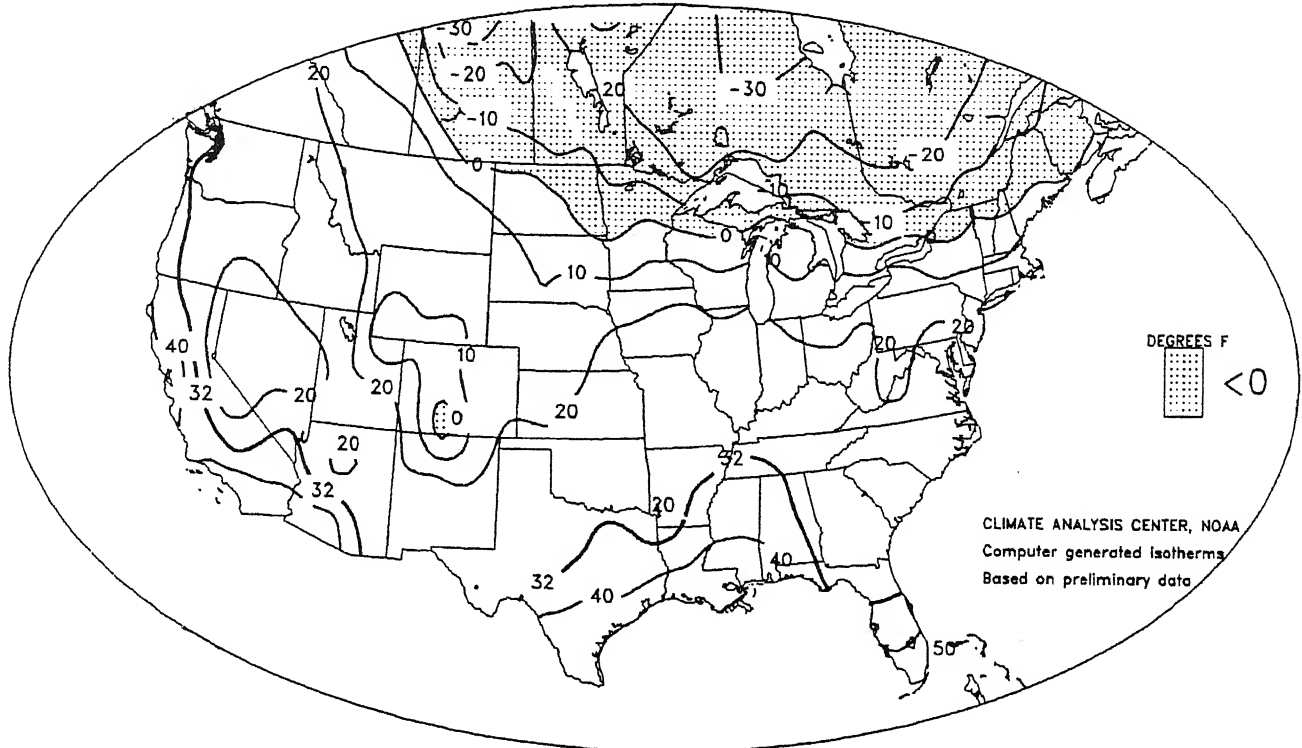
STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
GLASGOW, MT	+15.4	33.1	IDAHO FALLS, ID	+11.1	36.9
BOZEMAN, MT	+14.8	38.0	OMAK, WA	+10.9	43.0
WORLAND, WY	+13.6	37.2	DEVIL'S LAKE, ND	+10.9	20.8
LINCOLN, NE	+13.3	41.5	ST. LOUIS, MO	+10.6	45.9
MILES CITY, MT	+12.5	36.5	BLUE CANYON, CA	+10.5	48.8
LEWISTOWN, MT	+12.3	37.7	GRAND ISLAND, NE	+10.5	39.4
HAVRE, MT	+12.2	34.8	OTTUMWA, IA	+10.5	38.0
HELENA, MT	+11.9	39.7	WILMINGTON, NC	+10.4	58.6
BUTTE, MT	+11.9	34.7	SALINA, KS	+10.4	45.1
FLORENCE, SC	+11.4	59.3	AUGUSTA, GA	+10.3	58.7
PONCA CITY, OK	+11.4	50.6	NORFOLK, NE	+10.3	35.9
DES MOINES, IA	+11.4	37.9	WASHINGTON/DULLES AIRPORT, VA	+10.1	43.5
COLUMBIA, SC	+11.2	59.2	SIOUX CITY, IA	+10.0	35.1
CHARLESTON, SC	+11.1	61.8			

TABLE 3. Selected stations with temperatures averaging 2.0°F or more BELOW normal for the week.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
ST. PAUL ISLAND, AK	-19.4	2.4	KODIAK, AK	-5.6	25.3
COLD BAY, AK	-9.4	18.1	BETHEL, AK	-5.4	1.1
KING SALMON, AK	-9.1	6.2	MCGRATH, AK	-4.3	-4.6
BETTLES, AK	-8.7	-12.7	HOMER, AK	-3.5	21.7
ILIAMNA, AK	-8.6	9.2	TALKEETNA, AK	-2.1	13.7
BIG DELTA, AK	-5.8	-1.8			

EXTREME MINIMUM TEMPERATURE (°F)

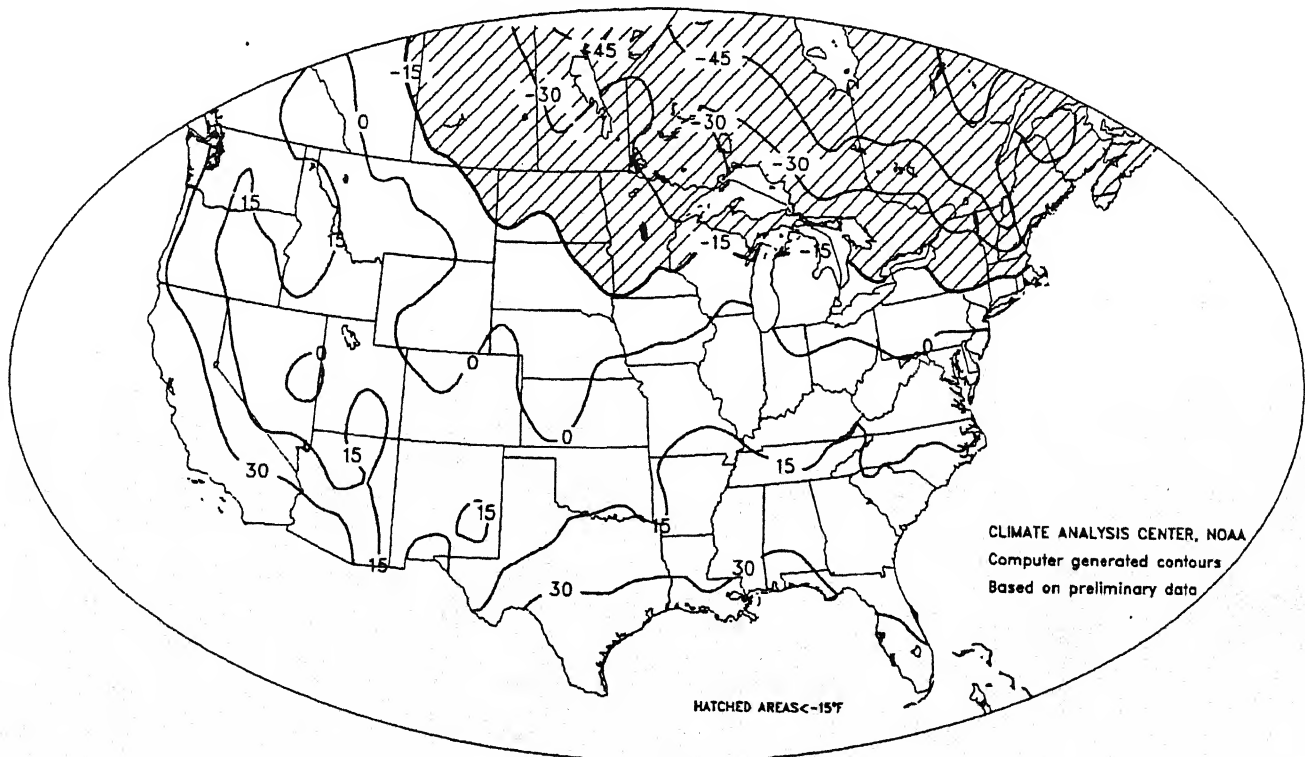
February 17 – 23, 1991



Unseasonably mild weather prevailed across much of the nation as Arctic air retreated northward during the week, with subzero temperatures restricted to the northern Great Plains, upper Midwest, and northern New England (top). Consequently, the most dangerous wind chills ($< -15^{\circ}\text{F}$) were confined to the same regions (bottom).

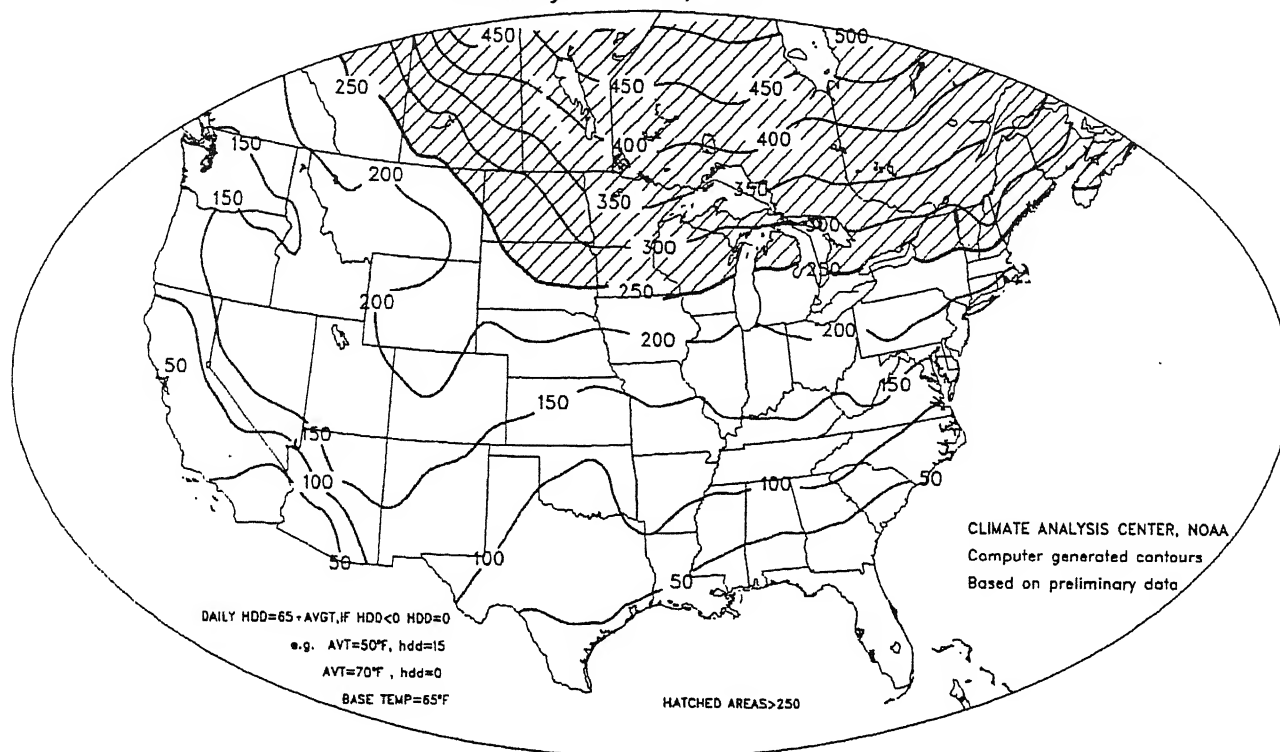
MINIMUM WIND CHILL (°F)

February 17 – 23, 1991



WEEKLY TOTAL HEATING DEGREE DAYS

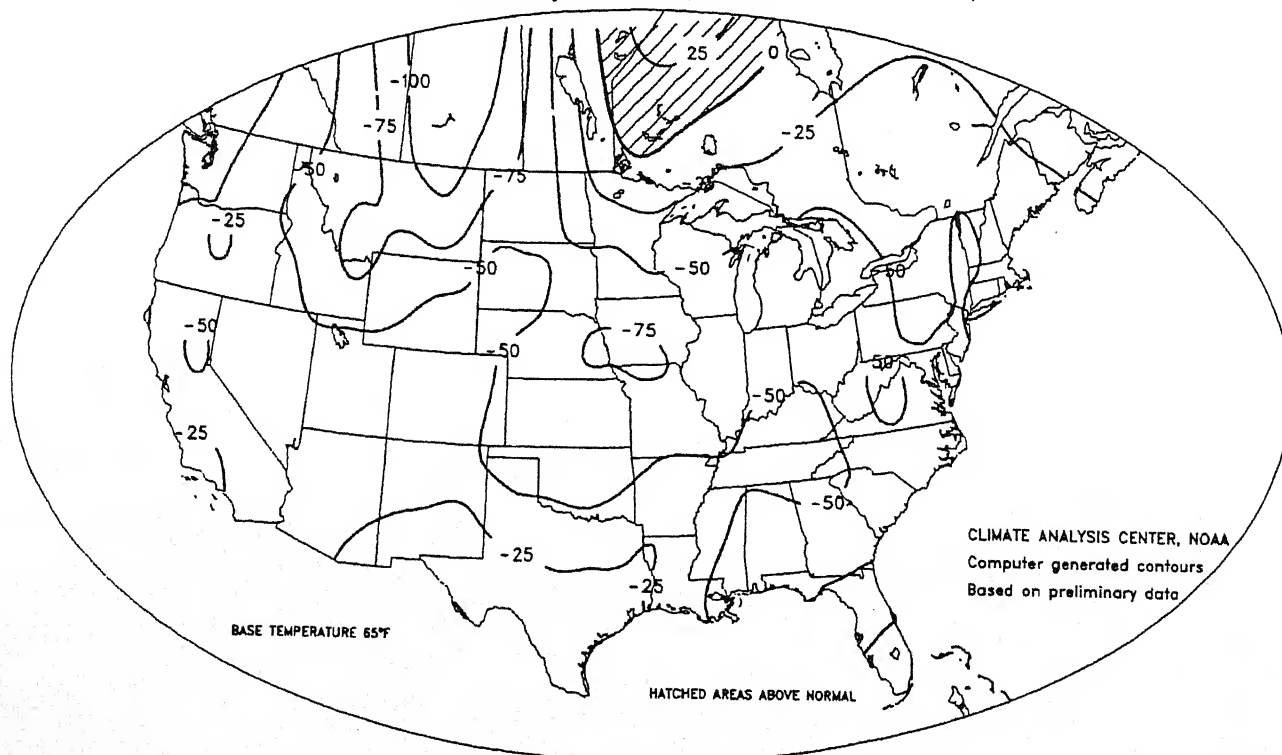
February 17 – 23, 1991



Abnormally high temperatures during the week resulted in light heating usage across most of the nation, with the greatest need (> 250 HDD's) restricted to the northern Great Plains across to northern New England (top). As a result of the mild conditions, the entire nation experienced below normal heating demand (bottom).

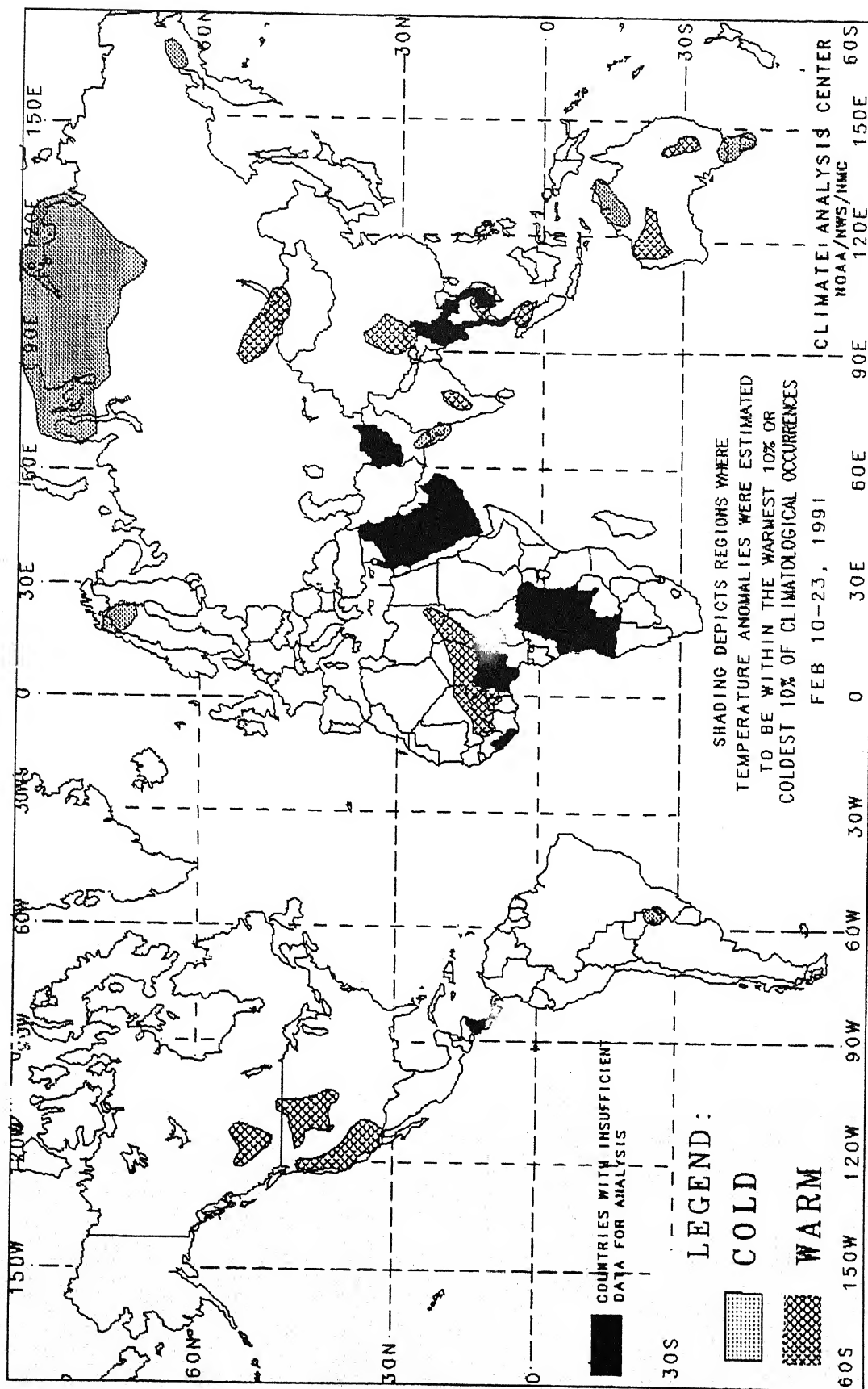
WEEKLY DEPARTURE FROM NORMAL HDD

February 17 – 23, 1991



GLOBAL TEMPERATURE ANOMALIES

2 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

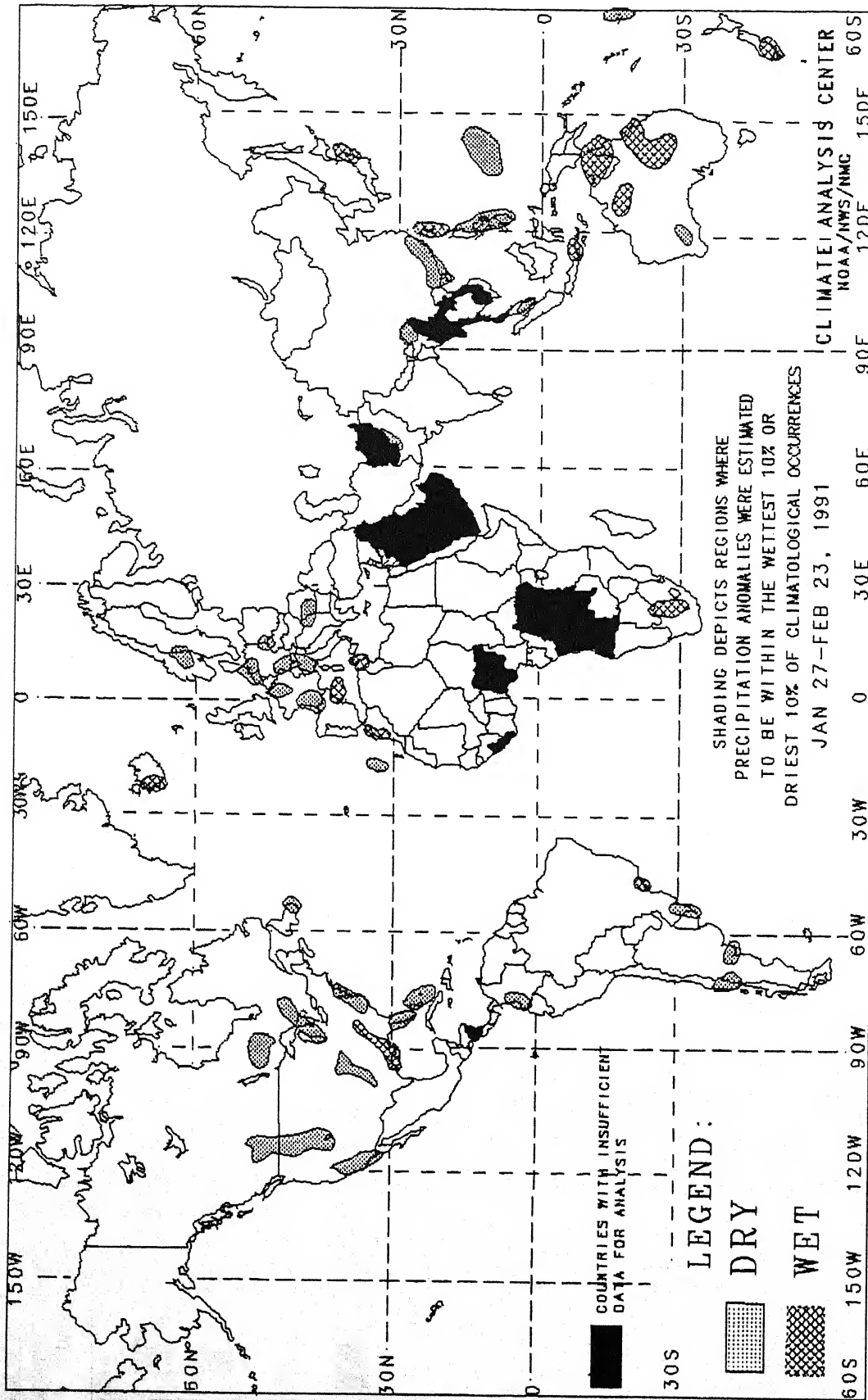
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY

Analysis and Information Branch
Climate Analysis Center, NMC
National Weather Service, NOAA

UPDATES ON SOUTHERN HEMISPHERE RAINY SEASON

In the last review of the rainy season across the Southern Hemisphere (specifically southeastern South America, northeastern Australia, and southern Africa) [see Weekly Climate Bulletin #90/48 dated December 1, 1990, pages 9-16], it was noted that the rainy season [normally October-April] was very slow to materialize in southern Africa and northern and eastern Australia, but that precipitation was quite abundant across southeastern South America. Most of eastern Argentina, Uruguay, and southern Brazil recorded much above normal autumn and early winter rainfall. Farther north, however, portions of south-central Brazil were drier than usual during this period, although heavy rains soaked much of this region in August and September.

In Australia, abnormally hot and dry weather continued during December, stressing summer crops in the southeastern sections of the continent. In sharp contrast, although the first three weeks of December were anomalously dry, torrential late month rains from Tropical Cyclone Joy inundated the coastal sugarcane crop areas of eastern Queensland. The rains were of such magnitude that monthly rainfall totals were 200-600% of normal even with an exceptionally dry first three weeks of December. Unfortunately, the rains produced severe flooding and reportedly damaged sugarcane and other crops. Widespread heavy tropical rains then continued to soak most of Queensland and the remainder of northern Australia during January and February, aggravating the flooding conditions. Well over 2000 mm of rain has saturated the sugarcane area along coastal Queensland [Figure 1], with Mackay and Bowen reporting moisture surpluses greater than 1450 mm since October 1 [not shown]. Increased January rainfall somewhat eased crop stress in southeastern Australia, but February rains have so far been well below normal. As a result, several locations along the coast and in western New South Wales have only received about half the normal seasonal rainfall [Figure 2].

Due to feeble spring and early summer rains, corn plantings were greatly delayed in most

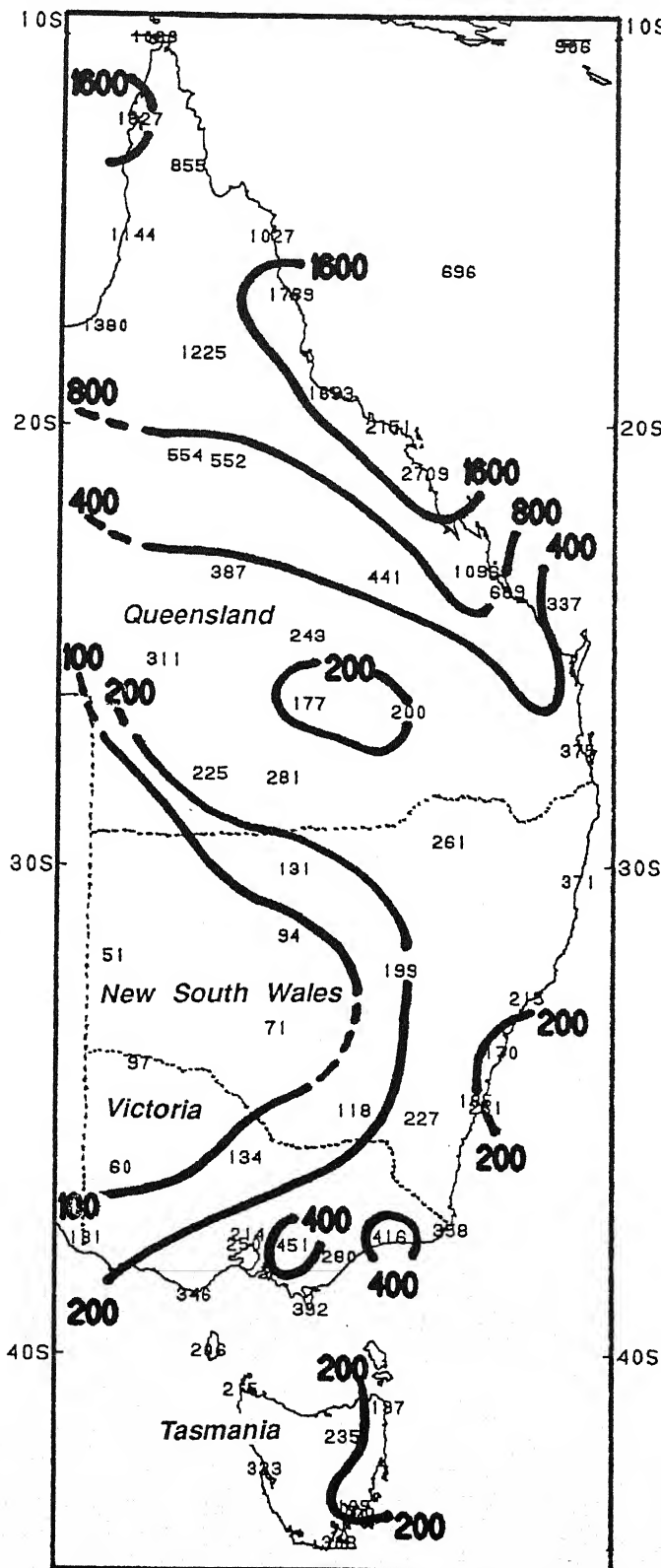


Figure 1. Total precipitation (mm) during October 1, 1990 - February 23, 1991 [146 days]. A station required at least 116 days (>80%) with adequate reports for inclusion. Isohyets are only drawn for 100, 200, 400, 800, and 1600 mm. After an extremely slow start to the 1990-1991 summer rainy season [approximately October-April] in northern Australia, particularly Queensland, continuous heavy rains since late December have more than alleviated the deficits accumulated during the spring and early summer months. Well over 2000 mm have dampened most of northern and central Queensland, and some eastern coastal locations have been inundated with over 2700 mm, producing severe flooding in the area and downstream. Farther south, however, much less rain has occurred, especially along the coasts of southern Queensland and New South Wales, and 5-month totals are below normal.

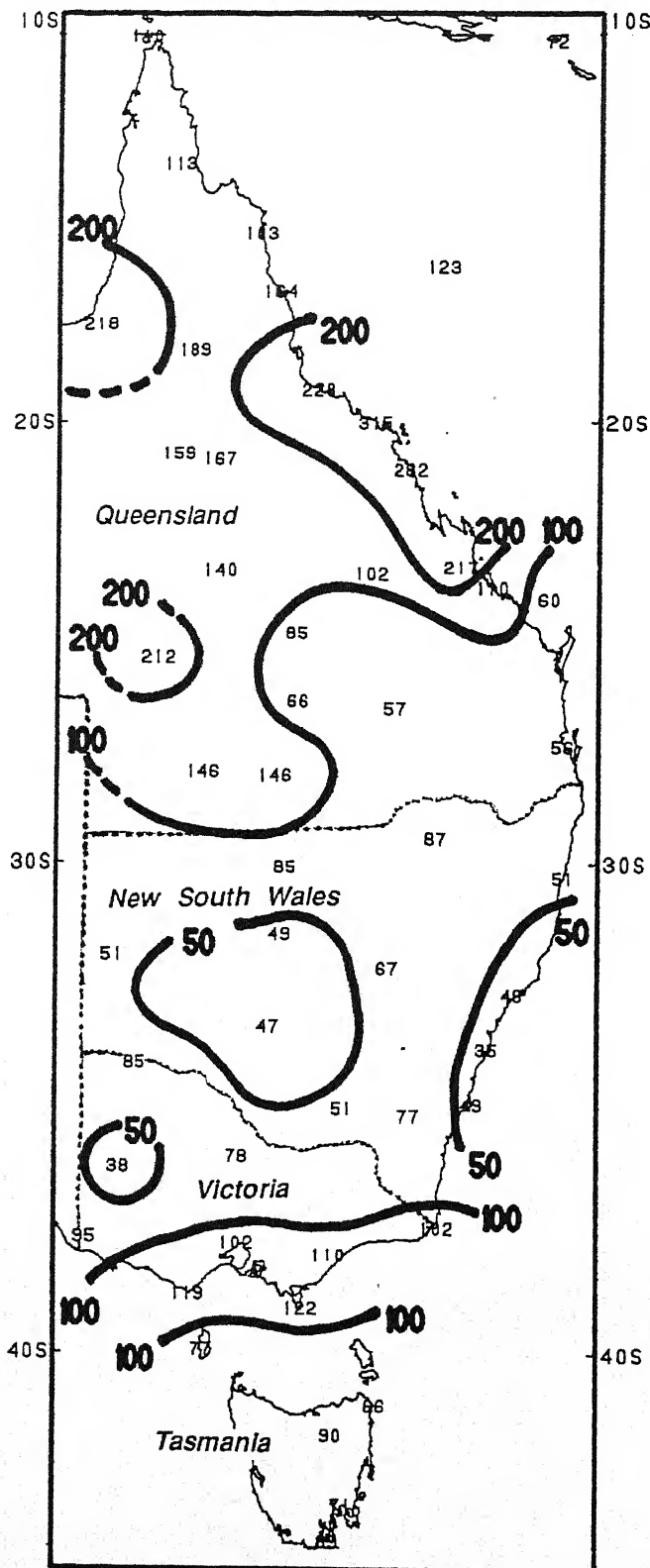


Figure 2. Percent of normal precipitation during October 1, 1990 - February 23, 1991 [146 days]. A station required at least 116 days (>80%) with adequate reports for inclusion. Isopleths are only drawn for 50, 100, and 200%. Since the persistent heavy summer rains began in late December, most of Queensland and the remainder of northern Australia have gone from abnormally dry to excessively wet. Unfortunately, most of the rains have missed southeastern Queensland and much of New South Wales, where parts of the latter state have recorded under half the normal rainfall. Deficits of more than 200 mm were found along coastal locations of both areas.

of South Africa. The spring rains were also slow to start in Zimbabwe, Zambia, Botswana, and Mozambique, but ample rains began to soak much of the region by mid-November. Favorable rains then fell across the Maize Triangle, especially in the west, during early December, providing timely top soil moisture for late planting, but subsequent warm and dry weather during the remainder of the month limited moisture for crop emergence and worsened drought conditions in north-central South Africa. Finally in early January, rainfall increased in coverage and intensity throughout the area, greatly improving moisture conditions, with parts of the drought-stricken western Triangle receiving more than twice the normal January rainfall. The generous rains continued into February, bringing seasonal rainfall totals closer to more typical levels [Figure 3], although several stations in the Maize Triangle still have moisture deficits of 50–150 mm. As expected, seasonal percentages have increased since the last review, with most of eastern Namibia, western Botswana, north-central South Africa, and parts of Zimbabwe now reporting above normal rainfall, and the rest of the region generally observing between 75% and 100% of the normal precipitation [Figure 4].

In southeastern South America, generally favorable rains throughout the period have provided sufficient moisture for crops in much of the region. Warm and dry weather during late December and early January, however, stressed soybeans and corn in the southern Brazilian state of Rio Grande do Sul. Fortunately, late January rains soaked the eastern portions of Rio Grande do Sul, bringing relief from short-term dryness. Widespread, heavy rains since late December have also brought seasonal totals above normal in eastern Sao Paulo and southern Minas Gerais states. Since October 1, 1990, much of northeastern Argentina, Uruguay, Paraguay, and southern Brazil have received near to above normal rainfall [Figure 6], with some stations accumulating more than 800 mm of rain [Figure 5].

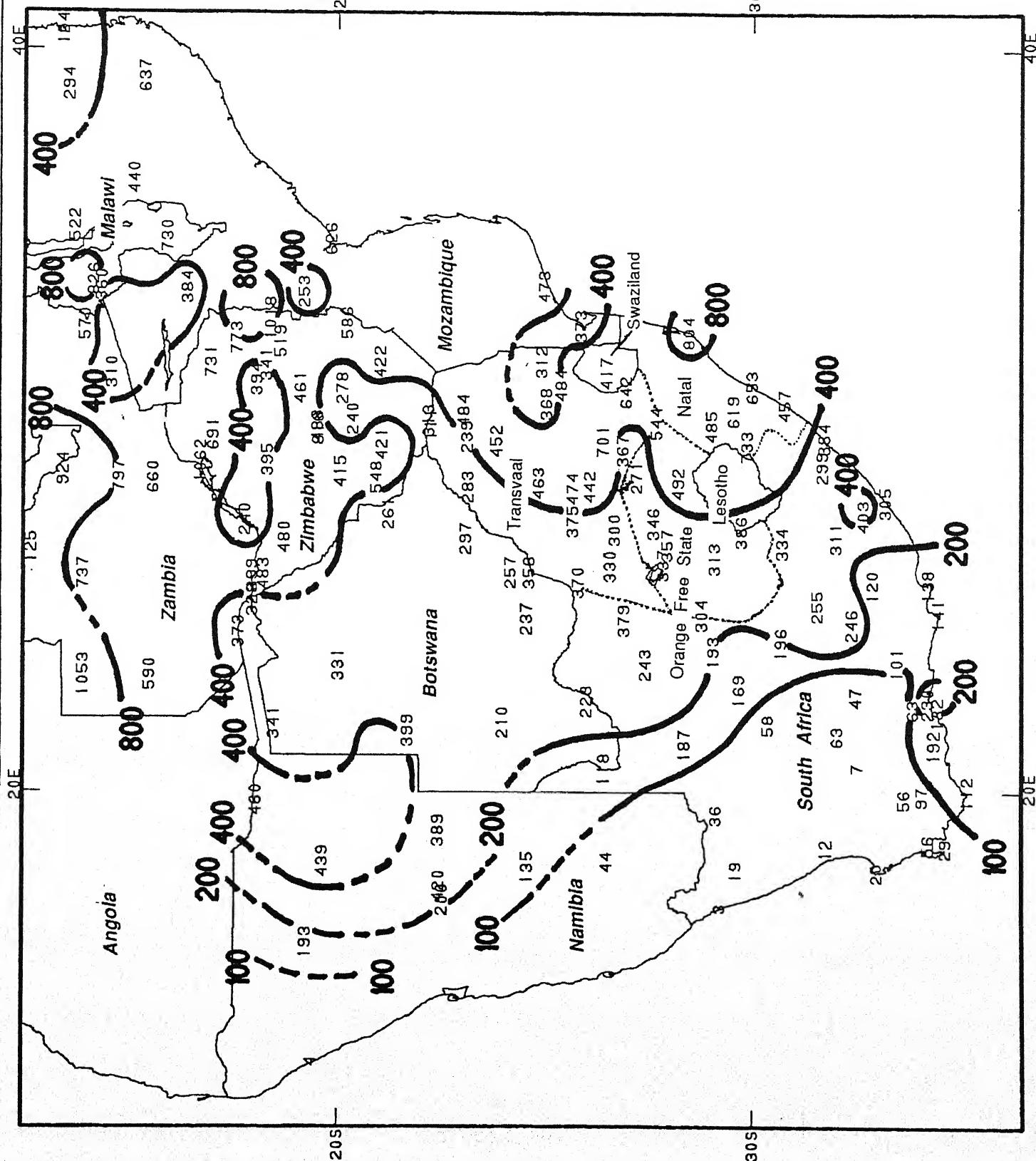


Figure 3. Total precipitation (mm) during October 1, 1990 - February 23, 1991 [146 days]. A station required at least 116 days (>80%) with adequate reports for inclusion. Isohyets are only drawn for 200, 400, and 800 mm. Similar to northeastern Australia, the rainy season in southern Africa also got off to an extremely slow start, especially in South Africa, where crop plantings were greatly delayed. Fortunately, the rains increased in intensity and coverage by mid-November in the northern portions, and finally by early January in southern sections. Since the start of 1991, the rains have generally persisted throughout the region, and seasonal totals are now close to or somewhat above normal.

Figure 4. Percent of normal precipitation during October 1, 1990 - February 23, 1991 [146 days]. A station required at least 116 days (>80%) with adequate reports for inclusion. Isoleths are only drawn for 50, 100, and 200%. Seasonal percentages are now closer to normal due to the increased rainfall since the start of the year. The large area of under 50% depicted in the last climate review (Dec. 1, 1990) has been replaced with values much closer to normal (through Feb. 23), and only a few spotty areas are less than 75% of normal. The greatest deficits (between 100 and 300 mm) were located in central Zimbabwe, central Mozambique, and South Africa's Transvaal (not shown).

